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## HAWKS AND OWLS FROM THE STANDPOINT OF THE FARMER.<sup>a</sup>

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### CAUSE OF THE PREJUDICE AGAINST BIRDS OF PREY.

The old saying that “a little knowledge is a dangerous thing” is exemplified in the way our hawks and owls are looked upon by a large majority of mankind. The farmer sees a hawk strike a fowl which has wandered from the farmyard; the sportsman, while planning the capture of a covey of quail, finds the mutilated remains of a game bird and feels sure it is the unlawful prey of a thieving owl—without further investigation both men condemn birds of prey as a class, and lose no opportunity to destroy them and their eggs and young.

The ill feeling has become so deep rooted that it is instinctive even in those who have never seen hawk or owl commit an overt act. How are we to account for this hatred against birds of prey by the very men who should be the first to clamor for their protection? The prejudice is largely due to lack of discrimination. Knowing that hawks and owls attack poultry, they do not stop to think that such depredations may be committed by a few species only, but sweepingly condemn the whole family. The reasoning is much the same as that of an Indian or frontiersman, who, being wronged by one individual, condemns a whole race. It would be just as rational to take the standard for the human race from the acts of highwaymen and pirates as to judge all hawks by the deeds of a few. Even when hawks are observed beating tirelessly back and forth over the harvest fields and meadows, or owls are seen flying silently about nurseries and orchards in search of the voracious rodents which destroy alike grain, produce, young trees, and eggs of birds, the curses of the majority of farmers and sportsmen go with them, and their total extinction would be welcomed.

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<sup>a</sup> Revised from Yearbook for 1894.

How often are the services rendered to man misunderstood through ignorance! The birds of prey, the majority of which labor day and night to destroy the enemies of the husbandman, are persecuted unceasingly, while that most destructive mammal the house cat is petted and fed and securely sheltered to spread destruction among the feathered tribe. The difference between the two can be summed up in a few words—only three or four birds of prey hunt birds when they can procure rodents for food, while the cat seldom touches mice if she can procure birds or young poultry. A cat has been known to kill 20 young chickens in a day, which is more than most raptorial birds destroy in a lifetime.

It is to be regretted that the members of the legislative committees who draft State game laws are not better acquainted with the life histories of raptorial birds. It is surprising also that gun clubs should be so far behind the times as to offer prizes to members who kill the greatest number of birds of prey. That the beneficial species of hawks and owls will eventually be protected there is not the slightest doubt, for when the farmer is convinced that they are his friends he will demand their protection. Already the leading agricultural papers and sportsmen's journals are deprecating the indiscriminate slaughter of these useful birds.

#### CHARACTERISTICS OF RAPACIOUS BIRDS.

The rapacious birds breed slowly, rearing only one brood a year, though if the first set of eggs is destroyed another will be laid. The young grow slowly and need a relatively large amount of food. To satisfy their hunger requires constant foraging on the part of the parents, and the strain of rearing the family is probably twice that of any of the other land birds. Even the adults are large eaters, gorging to the utmost when the opportunity presents; and as digestion is very rapid and assimilation perfect, a great quantity of food in relation to the body weight is consumed every day.

Hawks and owls are complementary to each other. While hawks hunt by day and keep diurnal mammals in check, owls, whose eyesight is keenest during twilight and before dawn, capture nocturnal species. Again, owls are less migratory than hawks, and during the long winter they remain in the land of ice and snow to wage incessant warfare against the enemies of the orchard, garden, and harvest field.

Although much may be learned by observing the food habits of live birds, the only way to determine the full range and relative percentages of the food elements is by examination of the stomach contents. A moderately complete and reliable index to the food of some birds of prey can be obtained by examining the "pellets." Hawks and owls often swallow their smaller victims entire, and tear the larger ones into several pieces, swallowing each fragment as it is detached. After

the nutritious portion of the food has been absorbed, the indigestible parts, such as hair, feathers, scales, bones, and other hard parts, are rolled into a solid ball by the action of the muscles of the stomach. These masses, known as "pellets," are regurgitated before fresh food is taken. The pellets contain everything necessary to identify the food, and in the case of some of the owls which have regular roosting places the pellets that collect underneath give an almost perfect record of the results of their hunting.

#### FOOD HABITS OF THE PRINCIPAL BIRDS OF PREY.

It is the object of the present paper to review briefly the food habits of the principal birds of prey of the United States, so that those interested may be able to distinguish between friends and foes, and thus be spared the necessity of indiscriminate slaughter.

Hawks and owls may be divided arbitrarily into four classes, according to their beneficial and harmful qualities:

- (1) Species wholly beneficial.
- (2) Those chiefly beneficial.
- (3) Those in which beneficial and harmful qualities about balance.
- (4) Harmful species.

It should be stated that several birds of prey belong to one or another class according to locality. A hawk or owl may be locally injurious because at that place mice, squirrels, insects, and other noxious animals are scarce, and consequently the bird is driven to feed on things of more or less value to man, while in other regions where its natural food abounds it does absolutely no harm. A good example of this kind is given under the head of the great horned owl.

To the wholly beneficial class belong the large rough-legged hawk, its near relative, the squirrel hawk or ferruginous roughleg, and the four kites—the white-tailed kite, Mississippi kite, swallow-tailed kite, and everglade kite.

The chiefly beneficial class contains a majority of our hawks and owls, and includes the following kinds: Marsh hawk, Harris hawk, red-tailed hawk, red-shouldered hawk, short-tailed hawk, white-tailed hawk, Swainson hawk, short-winged hawk, broad-winged hawk, Mexican black hawk, Mexican goshawk, sparrow hawk, Audubon caracara, barn owl, long-eared owl, short-eared owl, great gray owl, barred owl, western owl, Richardson owl, Acadian owl, screech owl, flammulated screech owl, snowy owl, hawk owl, burrowing owl, pygmy owl, ferruginous pygmy owl, and elf owl.

The class in which the harmful and beneficial qualities balance includes the golden eagle, bald eagle, pigeon hawk, Richardson hawk, Aplomado falcon, prairie falcon, and great horned owl.

The harmful class comprises the gyrfalcons, duck hawk, sharp-shinned hawk, Cooper hawk, and goshawk.

## WHOLLY BENEFICIAL HAWKS.

We will now take up each class and examine the food habits of the several species more or less in detail. The harmless kinds include the four kites, which, if not as beneficial as some of the hawks, are at least perfectly harmless. The *everglade kite* is found within our borders in Florida only, where it is restricted to the middle and southern portions. It feeds exclusively on a large fresh-water snail, which abounds in the shallow lakes and overflowed sections. The swallow-tailed, Mississippi, and white-tailed kites feed largely upon reptiles and insects, and never so far as known attack birds. The *swallow-tailed* is reported to feed extensively on the cotton worm during the summer and early fall. If this is a common habit, it at once brings the bird



FIG. 1.—Swainson Hawk (*Buteo swainsoni*).

into prominence as of economic importance and of great value to the southern planter. The *Mississippi kite* and its white-tailed ally devour large numbers of lizards, small snakes, and insects, especially grasshoppers and beetles.

The *rough-legged hawk*, and the *ferruginous roughleg*, or *squirrel hawk*, as it is sometimes called on account of its fondness for ground squirrels, so destructive in the West, are among our largest and most beneficial hawks. The former breeds wholly north of the United States, migrating south in September and October and remaining until the following April. The latter breeds extensively through the Great Plains region. The winter range of the roughleg is determined more

by the fall of snow than by the intensity of cold, the main body advancing and retreating as the barrier of snow melts or accumulates. Meadow mice and lemmings form the staple food of this bird. In this country lemmings do not reach our territory except in Alaska, but in the north of Europe they occasionally form into vast, migrating, devastating hordes which carry destruction to crops in the country invaded. The vole, or meadow mouse, is common in many parts of this country, and east of the Mississippi River without doubt is the most destructive mammal to agriculture. It destroys meadows by tunneling under them and eating the roots of grass. This mouse also destroys grain and various kinds of vegetables, especially tubers, but probably does even more damage by girdling young fruit trees. In 1892 considerable areas in southeastern Scotland were overrun by meadow mice and a large amount of property was destroyed during the "vole plague." Just such invasions are to be expected in any country where predaceous mammals and birds are reduced to a minimum in the supposed interest of game preservation. This wholly upsets nature's balance, and the injurious rodents are left practically without an enemy to control their increase. Attempts have been made in some of our States to reduce the number of hawks and owls by offering bounties for their heads, but fortunately the work has not been carried far enough to do the harm that has resulted from the long-continued efforts of gamekeepers in Great Britain.

The *roughleg* is one of man's most important allies against meadow mice, feeding on little else during its six months' sojourn in the United States. It thus renders important service in checking the ravages of these small but formidable pests. The roughleg is somewhat crepuscular in habits, being on the alert during twilight and early dawn, when small mammals are most active. Other mice, rabbits, and ground squirrels are eaten occasionally, and some of the older writers state that waterfowl are captured by this bird. The writer has made careful inquiries of a considerable number of persons who have had extensive field experience where these birds are common, and in no instance has he heard of their attacking birds. Even better evidence is found in the fact that stomachs of specimens shot in locations teeming with waterfowl contained nothing but the remains of meadow mice.

The *ferruginous roughleg* is as fully beneficial as its relative, though the character of its food differs somewhat. In many parts of the country inhabited by it, meadow mice, which play such an important part in the economy of the other bird, are scarce or wanting, but are replaced by nearly as destructive rodents, the ground squirrels. Upon these this large and handsome hawk wages continuous warfare, and great is the service it performs in keeping their numbers in check. Rabbits, prairie dogs, and occasionally pouched gophers are

eaten. It is humiliating to think how many of these two noble hawks are ruthlessly murdered, and to reflect that legislators put bounties on their heads to satisfy the ignorant prejudices of their constituents.

#### HAWKS AND OWLS MOSTLY BENEFICIAL.

Nearly two-thirds of the birds of prey inhabiting the United States belong in the present class, which comprises such hawks and owls as are mainly beneficial. A few of the more useful and well-known species will be considered in detail.

The *marsh hawk* is one of the most valuable on account of its abundance, wide distribution, and habits. It is more or less common throughout the United States and may be easily recognized by its white rump, slender form, and long, narrow wings, as it beats untiringly over the meadows, marshes, and prairie lands in search of food. If it were not that occasionally it pounces upon small birds, game, and poultry, its place in the first class would be insured, for it is an indefatigable mouser. Rodents, such as meadow mice, rabbits, arboreal squirrels, and ground squirrels, are its favorite quarry. In parts of the West the last-named animals form its chief subsistence. Lizards, snakes, frogs, and birds also are taken.

From its abundance, wide distribution, and striking appearance, the *red-tailed hawk* is probably the best known of all the larger hawks. Since it is handicapped by the misleading name "hen hawk," its habits should be carefully examined. There is no denying that both it and the *red-shouldered hawk*, also known as "hen hawk," do occasionally eat poultry, but the quantity is so small in comparison with the vast numbers of destructive rodents consumed that it is hardly worth mentioning. While fully 66 per cent of the red-tail's food consists of injurious mammals, not more than 7 per cent consists of poultry, and it is probable that a large proportion of the poultry and game captured by it and the other buzzard hawks is made up of old, diseased, or otherwise disabled fowls. It is well known to poulterers and owners of game preserves that killing off the diseased and enfeebled birds, and so preventing their interbreeding with the sound stock, keeps the yard and coveys in good condition and hinders the spread of fatal epidemics. It seems, therefore, that the birds of prey which catch aged, frost-bitten, and diseased poultry, together with wounded and crippled game, are serving both farmer and sportsman.

Abundant proof is at hand to show that the red-tail greatly prefers the smaller mammals, reptiles, and batrachians, taking little else when these can be obtained in sufficient numbers. If hard pressed by hunger, however, it will eat any form of life and will not reject even offal and carrion; dead crows from about the roosts, poultry which has been thrown on the compost heap, and flesh from the carcasses of goats, sheep, and the larger domesticated animals are eaten at such

times. Immature hawks are more apt to commit depredations than adults, the reason probably being that they lack skill to procure a sufficient quantity of their staple food. A large proportion of the birds eaten consists of ground-dwelling species, which probably are snatched up while half concealed in the grass or other vegetation. Among the mammals most often eaten and most injurious to mankind are the arboreal and ground squirrels, rabbits, voles and other mice. The stomachs of the red-tailed hawks examined contained Abert squirrel, red squirrel, three species of gray squirrels, two species of chipmunks, Say ground squirrel, plateau ground squirrel, Franklin



FIG. 2.—Red-tailed Hawk (*Buteo borealis*).

ground squirrel, striped ground squirrel, harvest mouse, common rat, house mouse, white-footed mouse, Sonoran white-footed mouse, wood rat, meadow mouse, pine mouse, Cooper lemming mouse, cotton rat, jumping mouse, porcupine, jack rabbit, three races of cottontails, pouched gopher, kangaroo rat, skunk, mole, and four kinds of shrews. The larger insects also, such as grasshoppers, crickets, and beetles, are sometimes extensively used as food.

The *red-shouldered hawk*, or, as it is sometimes incorrectly called, the “hen hawk,” is common, and very valuable to the farmer. It is

more nearly omnivorous than most of our birds of prey, and is known to feed on mice, birds, snakes, frogs, fish, grasshoppers, centipedes, spiders, crawfish, earthworms, and snails. As about 90 per cent of its food consists of injurious mammals and insects, and hardly 1½ per cent of poultry and game, the reader may draw his own conclusions as to the appropriateness of the title "hen hawk," so often misapplied to this species. A pair of these hawks bred for successive years within a few hundred yards of a poultry farm containing 800 young chickens and 400 ducks, and the owner never saw them attempt to catch a fowl. Besides mice, squirrels, shrews, and insects, which form their principal food, frogs, snakes, and crawfish also are taken.

Such facts as these must convince intelligent persons not only that it is folly to destroy this valuable bird, but that everywhere it should be fostered and protected.

The food of *Swainson hawk* (fig. 1) is of much the same character as that of the two preceding species, except that more insects and fewer birds are taken. Soon after the breeding season the hawks collect in the foothills and on the plains of the West, forming flocks, some of which contain hundreds of individuals, and feed almost exclusively on grasshoppers and crickets. If we assume that 100 grasshoppers, which is only three-quarters of the number actually found in a stomach after a single meal, is the daily allowance for one hawk, we have a grand total of 900,000 for the work of a flock of 300 birds in one month. The weight of this vast number of insects, allowing 15.4 grains for the weight of each, amounts to 1,984 pounds. An average of a number of estimates given by entomologists places the quantity of food daily devoured by a grasshopper as equal to its own weight; consequently if these grasshoppers had been spared by the hawks the farmer would have lost in one month nearly 30 tons of produce. The above estimate is probably much too low; for each hawk doubtless eats at least 200 grasshoppers daily, which would double the amount, making the loss 60 tons instead of 30. This is the work of a month for only 300 hawks. What estimate can be placed on the services of the hundreds of thousands which are engaged in the same work for months at a time? In many places hawks are all that are left of the mighty army which once waged war against these insect pests and so kept them in check. The game birds, such as the wild turkey, prairie chicken, grouse, and quail, have been swept away by the ruthless hand of man, and even the skunks, foxes, and snakes are rapidly following. To make matters worse, at least one western State passed a bounty act against hawks and owls, as a result of which thousands of grasshopper-eating hawks were destroyed at the public expense. Is it a wonder that after their enemies were reduced to a minimum the grasshoppers increased and spread destruction before them?

All naturalists who have written on the habits of *Swainson hawk*

affirm that it is a great enemy to the ground squirrel and other injurious rodents which infest the West and torment the farmer. The evidence shows that it rarely touches poultry, game, or small birds. In the Southwest the writer has often seen the nests of small birds in the same trees and in close proximity to the nests of the hawks, the birds apparently living in perfect harmony. Other observers have noticed the same thing.

The *broad-winged hawk*, a medium-sized species, common throughout the eastern United States, feeds largely on insects, small mammals, snakes, toads, and frogs, and occasionally on small birds. It is especially fond of the larvæ or caterpillars of the large moths which feed upon the leaves of fruit and shade trees. These insects are too large and formidable for the smaller insectivorous birds to attack; hence their principal enemies are hawks, of which the one under consideration is the most important. It feeds extensively also upon grasshoppers, crickets, cicadæ, May beetles and other coleoptera. Like the other buzzard hawks (*Buteo*), it is fond of meadow mice, and eats also considerable numbers of chipmunks, shrews, red squirrels, and occasionally rabbits and moles. Probably the greatest damage done by this hawk is the destruction of toads and snakes, which are mainly insectivorous and hence beneficial to the farmer.

The *sparrow hawk* is the smallest and handsomest of our birds of prey, and, with the possible exception of the red-tail, the best known. It is the only one of the true falcons which can be placed in the "mainly beneficial" class. At times it attacks small birds and young chickens, but these irregularities are so infrequent that they are more than outweighed by its good services in destroying insects and mice. Grasshoppers, crickets, and other insects form its principal food during the warm months, while mice predominate during the rest of the year. Terrestrial caterpillars, beetles, and spiders also are eaten to a considerable extent. As might be expected, a large proportion of the birds captured are taken during the nesting season, the hawks then having less time to procure their favorite food. It is at this time also that they commit depredations in poultry yards. During late fall and winter, meadow mice and house mice form a large part of their food, the former being taken in fields and meadows and the latter around corn stacks and about barns and outbuildings. Because of its confidence and lack of fear, the sparrow hawk is one of the species which suffers most from unjust bounty laws. Any vandal who can carry a gun is able to slaughter this little hawk. Mr. W. B. Hall, of Wakeman, Ohio, writes us that while the hawk law was in force in Ohio he was township clerk in his native village and issued 86 certificates, 46 being for sparrow hawks. He examined the stomachs and found 45 of them to contain the remains of grasshoppers and beetles, while the remaining one contained the fur and bones of a meadow mouse. Mr.

H. W. Henshaw, visiting Colorado in 1883, after the bounty act had been in force for some time, found that the sparrow hawks had been almost exterminated in districts where several years before he had found them exceedingly numerous.

The *barn owl* is a southern species, rarely occurring with regularity in the northern half of the United States except west of the Sierra Nevada. Its food is made up almost entirely of mammals, with now and then a few insects, and occasionally a bird. Among the former are several species of rodents which, from their great numbers and destructive habits, are a curse to the country they inhabit. Of this group the pouched gopher is one of the most destructive, not only to

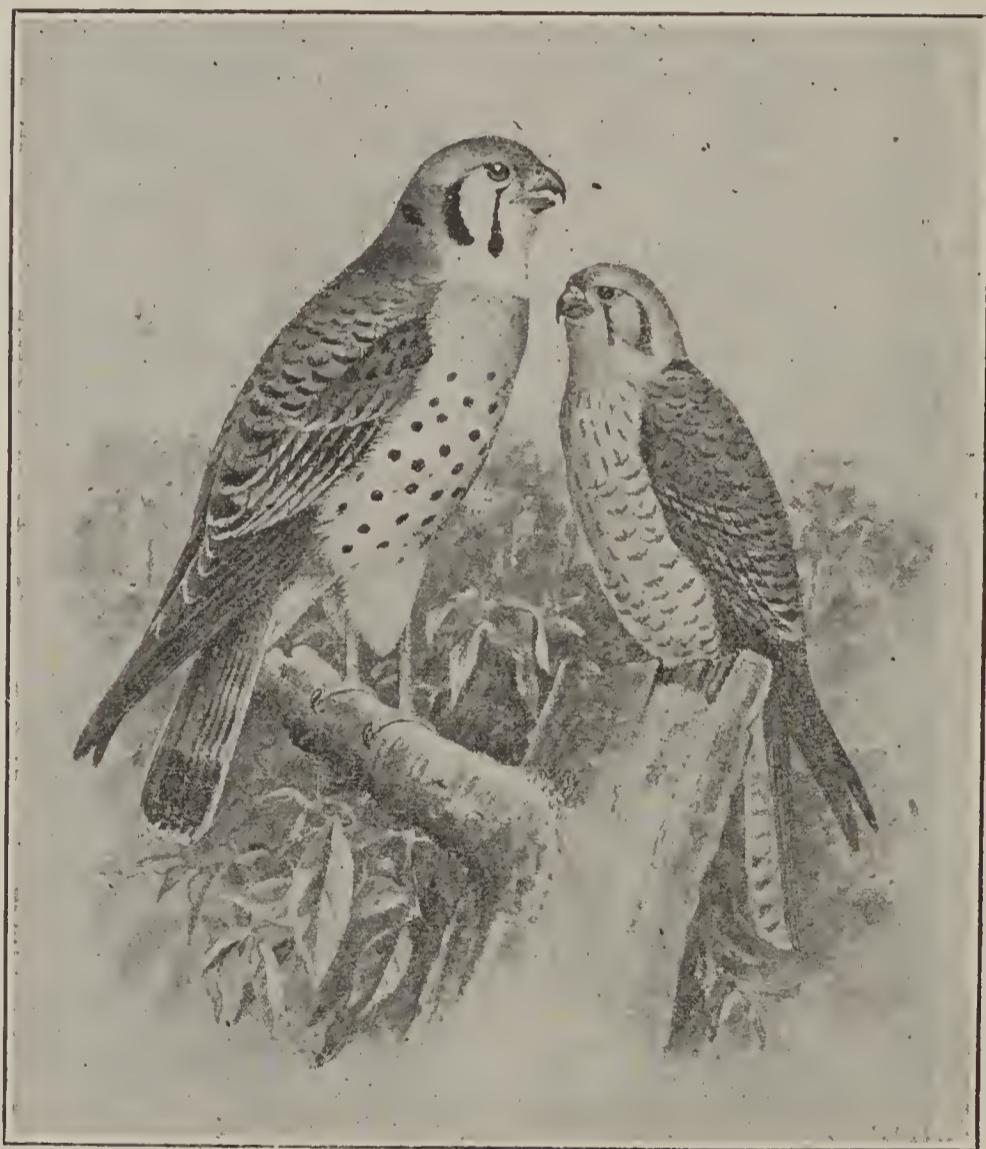


FIG. 3.—Sparrow Hawk (*Falco sparverius*).

vegetables and grain crops, but also to shade and fruit trees. The injuries to trees are the most serious, as the animals sometimes gnaw off the roots and destroy entire groves and orchards. In California, where this mammal is common, the barn owl feeds very extensively on it. In the South Atlantic and Gulf States the owl feeds extensively on the cotton rat, a mammal of destructive habits abounding in the bottom lands and near water. The common rat also is greedily devoured. The writer has examined the contents of 200 pellets taken from the nesting site of a pair of these owls in one of the towers of

the Smithsonian Institution. Of the total of 454 skulls contained in these pellets there were 225 meadow mice, 2 pine mice, 179 house mice, 20 rats, 6 jumping mice, 20 shrews, 1 starnosed mole, and 1 vesper sparrow. These results afford a pretty complete index to the kinds of food eaten by this species in the East, along the northern border of its range.

The *long-eared owl* is an industrious mouser, and molests comparatively few birds. Several years ago we examined 107 stomachs of this owl, of which 15 were empty. Of the 92 remaining, 86, or over 93 per cent, contained remains of small mammals. As the bird is common all over the United States, it does an enormous amount of good. Like the sparrow hawk, this owl is easily destroyed, and so is one of the greatest sufferers when bounties are paid for the destruction of birds of prey.

The *short-eared owl* is another common species, but is not so generally distributed as the preceding. It lives in more open country, and in fall and winter often congregates in large bands about meadow lands and the larger marshes. Fully 75 per cent of its food consists of mice; as many as six of these mammals have been found in one stomach. In the West it probably feeds also on the smaller ground squirrels, but we have been unable to procure much positive data on the subject. Among birds, the sparrows inhabiting the meadows and prairies are most often taken. In an interesting article by Mr. Peter Adair, in the Annals of Scottish Natural History for October, 1893, on the disappearance of the short-tailed vole that caused the vole plague in Scotland in 1890-1892, the statement is made that farmers and shepherds attribute its disappearance largely to its natural enemies, stress being laid on the services of the owl, kestrel, rook, and black-headed gull among birds and the stoat and weasel among mammals. These men are also of the opinion that this vole plague resulted from the destruction of birds of prey. When the plague first commenced the short-eared owl was hardly known in the district, but, swarming thither, it bred till it was so numerous that it became an important factor in reducing the number of voles.

The *barred owl* is one of the larger common species in eastern North America. It has the reputation, especially among the older writers, of being very destructive to poultry. Our examination of 100 stomachs shows that about  $4\frac{1}{2}$  per cent of its food consists of poultry and game. Half-grown fowls which roost among trees and bushes are the ones that suffer. If chickens were shut up at night the owl would not be tempted to depart from its regular diet. The barred owl is more given to cannibalistic habits than any of the other species. Of 109 stomachs which passed under the writer's notice 7 contained the remains of smaller owls. Insects, such as grasshoppers, crickets, May beetles, and other coleoptera, are frequently taken. In some localities

crawfish form a considerable portion of this owl's food, and frogs and fish occasionally are eaten. Most of its food, however, consists of small mammals, among them some of the most destructive rodents the farmer has to contend with. The following list shows the species of mammals positively identified in the stomach contents: Meadow mouse, pine mouse, short-tailed shrew, chipmunk, red squirrel, flying squirrel, cottontail rabbit, golden mouse, white-footed mouse, red-backed mouse, common mole, Cooper lemming mouse, and common rat. In summing up the facts relative to the food habits of this owl, it appears that although it occasionally makes inroads upon poultry and game, it destroys large numbers of injurious mammals and insects, and hence should be protected.



FIG. 4.—Barred Owl (*Syrnium varium*).

The little *screech owl* is well known throughout the greater part of the United States. With the exception of the *burrowing owl*, it feeds more extensively on insects than any of the other owls. It is also a diligent mouser, and feeds more or less on crawfish, frogs, toads, scorpions, lizards, and fish. Of 254 stomachs examined, birds were found in about 15 per cent. Fully one-third of these consisted of English sparrows, and a large proportion of the rest were ground-dwelling sparrows, which feed largely on seeds and are of little economic importance. Among insects, grasshoppers, crickets, beetles, and cut-worms are most often eaten. As many as 50 grasshoppers have been found in one stomach, 18 May beetles in another, and 13 cut-

worms in a third. During the warmer parts of the year it is exceptional to find a stomach not well filled with insect remains. Meadow mice, white-footed mice, and house mice are the mammals most often taken, while chipmunks, wood rats, flying squirrels, and moles are less frequently found. The screech owl is fond of fish and catches many, especially in winter, when it watches near the breathing holes in the ice, and seizes the luckless fish which comes to the surface. Most of the birds destroyed by this owl are killed either in severe winter weather or during the breeding season, when it has hard work to feed its young. As nearly three-fourths of the owl's food consists of injurious mammals and insects, and only about one-seventh of birds (a large proportion of which are destructive English sparrows), there is no question that this little owl should be carefully protected.

The *snowy owl* is a large, arctic species, considerable numbers of which visit the United States in winter. On account of its size and strength it is capable of doing great good in destroying noxious mammals. The stomachs examined were collected between the last of October and March and the contents make a very good showing for the bird. Although a number of water birds were found, a large proportion consisted of mammal remains. One stomach contained 14 white-footed mice and 3 meadow mice, and in others as many as 5 to 8 of these little rodents were found. The common rat appeared in a number of stomachs and seems to be considerably sought after. It is a lamentable fact that this useful bird is slaughtered in great numbers whenever it appears within our limits. According to Mr. Ruthven Deane, as many as 500 were killed in New England during the winter of 1876-77.

Although the little *burrowing owl* is preeminently an insect-eating bird, it feeds also on small mammals and rarely on birds. It is common throughout the plains of the West, where in many localities it is a permanent resident. During the warmer months it feeds almost exclusively on insects and scorpions, and at other times on small mammals. Among insects, grasshoppers, crickets, beetles, and caterpillars are taken in large quantities, and the birds may be seen pursuing the more agile species even at midday. The burrowing owl is a beautiful, harmless bird, and should be protected by law.

So insignificant is the injury they do by destroying birds and poultry compared with the good they do by destroying noxious mammals and insects, that it is a question whether for practical purposes the slightly harmful owls should not be included in the wholly beneficial class.

#### SPECIES PARTLY BENEFICIAL AND PARTLY HARMFUL.

The golden eagle, bald eagle, pigeon hawk, Richardson hawk, Aplomado falcon, prairie falcon, and great horned owl belong to the

third class, which includes those whose beneficial and noxious qualities about balance each other. Still at times any of them may become decidedly beneficial in localities infested by some of the numerous rodents which injure crops. The *golden eagle*, an inhabitant of the Northern Hemisphere, is found in most parts of the United States, though it is more common in the West. Its food consists of fawns, rabbits, woodchucks, prairie dogs, and ground squirrels among mammals, and turkeys, grouse, and waterfowl among birds. At times it attacks also the young of domesticated animals, notably lambs, pigs, goats, and poultry. It has been known to attack calves and colts, but such instances must be exceptional and when the birds are hard pressed by hunger. Over extensive areas of the West the golden eagle and other birds of prey unite in keeping many species of noxious rodents in check, and must be considered beneficial. In the more thickly inhabited regions, however, where such food is scarce, they often do great damage by carrying off lambs, young pigs, kids, and poultry. As many as four hundred lambs are reported to have been taken from contiguous ranges in one season. It thus will be seen that in one region the bird should be protected and in the other kept in check.

The *bald eagle*, the emblem of our country, is found in suitable localities throughout the United States, though it is more common near large bodies of water than elsewhere. Its favorite food is fish, and when they can be obtained, either by capture or in the shape of offal, it touches little else. A considerable proportion of the fish secured is taken from the osprey or fishhawk; still the eagle is fully capable of fishing for itself when necessity demands. Where fish are scarce or for any reason hard to procure, it feeds on waterfowl from the size of large swans down to the smaller ducks and coots. Like the golden eagle, it preys on destructive rodents in the West, and there is considered beneficial. Unfortunately it is fond of lambs, pigs, and poultry, and in the more thickly inhabited regions probably does as much damage as the golden eagle. Much sensational matter appears from time to time in newspapers about eagles attacking and carrying off children. Few of these stories have any foundation in fact.

The *pigeon hawk*, *Richardson hawk*, and *Applomado falcon* are true falcons. Though they feed on the flesh of birds, they destroy enough insects and noxious mammals to partially offset the injury they do. The *prairie falcon* inhabits the dry Western plains and neighboring mountains, in the cliffs of which it builds its nest. Throughout a large portion of the country inhabited by this species, poultry is scarce, as most ranchers do not yet attempt to raise it. Although this falcon feeds extensively upon waterfowl, quail, prairie chickens, and other game, it attacks also various kinds of injurious mammals, notably the smaller ground squirrels, such as the striped, Franklin, Richardson, Harris, and the allied species, which abound in many sections

of its range. In this respect it is of considerable service to the agriculturist, and probably offsets the injury done by destroying game; but, unfortunately, the data at hand are insufficient to show just how extensively it preys on these animals; hence the benefit done can not be correctly estimated.

One or other of the races of the large and handsome *great horned owl* is found throughout the United States where suitable timber exists for its habitation. It is a voracious bird, and its capacity for good or evil is very great. If the more thickly settled districts where pou-



FIG. 5.—Great Horned Owl (*Bubo virginianus*).

try is extensively raised could be passed by and the bird considered only as it appears in the great West, it would earn a secure place among the beneficial species, for it is an important ally of the ranchman in fighting the hordes of ground squirrels, gophers, prairie dogs, rabbits, and other rodents which infest his fields and ranges. Where mammals are plenty it does not seem to attack poultry or game birds to any considerable extent, but in regions where rabbits and squirrels are scarce it frequently makes inroads on fowls, especially where they roost in trees. Undoubtedly rabbits are its favorite food, though in some places the common rat is killed in great numbers; we have a record of the remains of over one hundred rats that were found under

one nest. The following is a list of the mammals taken from the stomachs examined: Three species of rabbits, cotton rat, two species of pouched gophers, two species of wood rats, chipmunk, two species of grasshopper mice, white-footed mouse, plateau ground squirrel, Harris ground squirrel, muskrat, fox squirrel, five species of meadow mice, one short-tailed shrew, the house mouse, common rat, black bat, red-backed mouse, flying squirrel, shrew, and kangaroo rat. Besides mammals and birds, insects (such as grasshoppers and beetles), scorpions, crawfish, and fish are also taken. The great horned owl (fig. 4) does a vast amount of good, and if farmers would shut up



FIG. 6.—Cooper Hawk (*Accipiter cooperi*).

their chickens at night instead of allowing them to roost in trees and other exposed places, the principal damage done by the bird would be prevented.

#### HARMFUL HAWKS AND OWLS.

We come now to the fourth, or harmful class, the members of which feed, to a marked degree, on poultry and wild birds. The gyrfalcons will not be considered, as they are northern species which very rarely enter the United States. The duck hawk also is so uncommon, except about large bodies of water, that it plays an unimportant part in

depredations upon poultry and upland game birds. During the migration of waterfowl along the seacoast, estuaries, large rivers, and lakes the duck hawk has an abundant supply of food, feeding upon ducks, coots, waders, and even at times on gulls and terns. It is only during the breeding season that this falcon ever troubles the farmer.

It is in the group of hawks embracing the goshawk, Cooper hawk, and sharp-shinned hawk that is to be found the probable cause for the unjust hatred and suspicion entertained for our birds of prey as a whole. All three feed largely upon the flesh of birds, of which game and poultry form a considerable part. They capture their prey not so much by swift, long-continued flight in the open as by quick turns and rapid dashes from cover, the victim being grasped before the hawk's presence is suspected. Fortunately, the *goshawk*, the largest of the three, is a northern species, and is rare in most parts of the United States, except in fall and winter. It is a large, powerful bird, easily killing and carrying off a full-grown fowl, ruffed grouse, or hare. Many are the accounts of its audacity in attacking poultry, taking it almost from under the very eyes of the owner, and even entering inhabited houses in pursuit of its intended victim. It also has been known occasionally even to attack a man. From the persistency with which this species hunts the ruffed grouse in many of the Northern States, it has received the name "partridge hawk." Mammals from the size of a full-grown hare down to the small mice also are captured, and it is stated that in the far north it feeds largely on lemmings.

*Cooper hawk* is preeminently a "chicken hawk," and is by far the most destructive species we have to contend with, not because it is individually worse than the goshawk, but because it is so much more numerous that the aggregate damage done far exceeds that of all other birds of prey. Although not so large as the goshawk, it is strong enough to carry away a good-sized chicken, grouse, or cottontail rabbit. It is especially fond of domesticated doves, and when it finds a cote easy of approach or near its nesting site, the inmates usually disappear at the rate of one or two a day until the owner takes a hand in the game. The arboreal and ground squirrels appear to be the mammals most frequently taken by Cooper hawk. Remains of chipmunks, red squirrels, and gray squirrels have been found in the stomachs.

The *sharp-shinned hawk*, a miniature of Cooper hawk, is fully as destructive to bird life as its larger cousin. Although rarely attacking full-grown poultry, it is very partial to chickens and often almost exterminates early broods which are allowed to run at large. No birds, from the size of doves, robins, and flickers to the smallest warblers and titmice, are safe from its attacks. In our previous examinations of the stomachs of this hawk the remains of nearly fifty

species of birds were recognized, and the list is of so much interest that it is here given: Arizona quail, mourning dove, downy wood-pecker, red-shafted flicker, yellow-shafted flicker, chimney swift, cowbird, orchard oriole, grackle, housefinch, goldfinch, savanna sparrow, western savanna sparrow, white-throated sparrow, field sparrow, chipping sparrow, tree sparrow, junco, song sparrow, fox sparrow, English sparrow, Abert towhee, red-eyed vireo, black and yellow warbler, black-throated green warbler, yellow-rumped warbler, bay-breasted warbler, blackpoll warbler, pine-creeping warbler, ovenbird, Maryland yellowthroat, blackcap, western blackcap, Canada warbler, mockingbird, catbird, crissal thrasher, cactus wren, Carolina wren, red-bellied nuthatch, chickadee, ruby-crowned kinglet, gray-cheeked thrush, hermit thrush, robin, and bluebird. To show how universally this species feeds on small birds it is only necessary to say that of 107 stomachs containing food 103, or 96 $\frac{1}{4}$  per cent, contained the remains of birds. Mammals and insects seem to be taken rarely, mice and grasshoppers being the ones most frequently chosen.

#### CONCLUSION.

It must be apparent to those who have carefully read the foregoing pages that the relentless persecution of our birds of prey as a class is not only unjust, but is extremely prejudicial to the interests of the farmer, orchardist, and sportsman. In many localities, however, the men directly interested are awakening to the facts of the case and are learning to cast aside prejudice and to appreciate the valuable services rendered by the indefatigable hawks and owls in ridding their fields, plantations, and covers of noxious pests. When this approved sentiment becomes more widespread and the true character of our predatory birds is more fully recognized, the occurrence of disastrous outbreaks of mammals and insects will be comparatively rare.

With the exception of the destructive Cooper hawk, sharp-shinned hawk, and great horned owl—species which all farmers and sportsmen should learn to distinguish—we may safely say that the rapacious birds are among the most, if not the most, valuable birds that wage war against the foes of the agriculturist.